WHAT IS CLAIMED IS:

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1. A vaccine comprising:
   (a) a pharmaceutically acceptable carrier, and
   (b) at least one polynucleotide having a *Chlamydia* sequence.

2. The vaccine of claim 1, wherein the at least one polynucleotide has a *Chlamydia psittaci* sequence.

3. The vaccine of claim 1, wherein the at least one polynucleotide has a *Chlamydia pneumoniae* sequence.

4. The vaccine of claim 1, wherein the at least one polynucleotide has a sequence isolated from a *Chlamydia* genomic DNA expression library.

5. The vaccine of claim 4, wherein the at least one polynucleotide has a sequence isolated from a *Chlamydia psittaci* genomic DNA expression library.

6. The vaccine of claim 1, wherein the at least one polynucleotide has a sequence of SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:40, SEQ ID NO:42, SEQ ID NO:44, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:50, SEQ ID NO:52, SEQ ID NO:54, SEQ ID NO:56, SEQ ID NO: 58, or SEQ ID NO:60, or fragment thereof.

7. The vaccine of claim 6, wherein the at least one polynucleotide has a sequence of SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID

NO:16, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, or SEQ ID NO:26, or fragment thereof.

8. The vaccine of claim 6, wherein the at least one polynucleotide has a sequence of SEQ ID NO:6, SEQ ID NO:10, SEQ ID NO:14, SEQ ID NO:20, or SEQ ID NO:24, or fragment thereof.

9. The vaccine of claim 1, wherein the at least one polynucleotide has a sequence of SEQ ID NO:62, SEQ ID NO:64, SEQ ID NO:66, or SEQ ID NO:68, or fragment thereof.

10. The vaccine of claim 1, comprising a polynucleotide encoding an antigen having a sequence of SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:45, SEQ ID NO:47, SEQ ID NO:49, SEQ ID NO:51, SEQ ID NO:53, SEQ ID NO:55, SEQ ID NO:57, SEQ ID NO:59, or SEQ ID NO:61, or an antigenic fragment thereof.

11. The vaccine of claim 1, comprising a polynucleotide encoding a antigen having a sequence of SEQ ID NO:63, SEQ ID NO:65, SEQ ID NO:67, or SEQ ID NO:69, or an antigenic fragment thereof.

12. The vaccine of claim 1, wherein the polynucleotide is comprised in a genetic immunization vector.

13. The vaccine of claim 12, wherein the vector comprises a gene encoding a mouse ubiquitin fusion polypeptide.

14. The vaccine of claim 12, wherein the vector comprises a promoter operable in eukaryotic cells.

15. The vaccine of claim 14, wherein the promoter is a CMV promoter.

16. The vaccine of claim 1, wherein the polynucleotide is cloned into a viral expression vector.

17. The vaccine of claim 16, wherein the viral expression vector is selected from the group consisting of adenovirus, adeno-associated virus, retrovirus and herpes-simplex virus.

18. The vaccine of claim 1, comprising at least a first polynucleotide having a *Chlamydia psittaci* sequence and a second polynucleotide having a sequence, wherein the first polynucleotide and the second polynucleotide have different sequences.

19. The vaccine of claim 6, wherein the first polynucleotide has a sequence of SEQ ID NO:50.

20. A vaccine comprising:

(a) a pharmaceutically acceptable carrier; and

(b) at least one *Chlamydia* antigen.

21. The vaccine of claim 20, wherein the at least one *Chlamydia* antigen has a sequence of SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:45, SEQ ID NO:47, SEQ ID NO:49, SEQ ID NO:51, SEQ ID NO:53, SEQ ID NO:55, SEQ ID NO:57, SEQ ID NO:59, or SEQ ID NO:61, or an antigenic fragment thereof.

22. The vaccine of claim 20, wherein the at least one *Chlamydia* antigen has a sequence of SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, or SEQ ID NO:27, or an antigenic fragment thereof.

23. The vaccine of claim 20, wherein the at least one *Chlamydia* antigen has a sequence of SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:21, or SEQ ID NO:25, or an antigenic fragment thereof.

24. The vaccine of claim 20, wherein the at least one *Chlamydia* antigen has a sequence of SEQ ID NO:63, SEQ ID NO:65, SEQ ID NO:67, or SEQ ID NO:69, or an antigenic fragment thereof.

25. A method of immunizing an animal comprising providing to the animal at least one *Chlamydia* antigen, or an antigenic fragment thereof, in an amount effective to induce an immune response.

26. The method of claim 25, wherein the provision of the at least one *Chlamydia* antigen comprises:

(a) preparing a cloned expression library from fragmented genomic DNA, cDNA or sequenced genes of *Chlamydia*;

(b) administering at least one clone of the library in a pharmaceutically acceptable carrier into the animal; and

(c) expressing at least one *Chlamydia* antigen in the animal.

27. The method of claim 26, herein the expression library comprises at least one or more polynucleotide having a sequence of SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:40, SEQ ID NO:42, SEQ ID NO:44, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:50, SEQ ID

NO52:, SEQ ID NO:54, SEQ ID NO:56, SEQ ID NO: 58, or SEQ ID NO:60, or fragment thereof.

28. The method of claim 26, herein the expression library comprises at least one or more polynucleotide having a sequence of SEQ ID NO:62, SEQ ID NO:64, SEQ ID NO:66, or SEQ ID NO:68, or fragment thereof.

29. The method of claim 27, wherein the polynucleotide is administered by a intramuscular injection or epidermal injection.

30. The method of claim 29, wherein the intramuscular injection is at least 1.0 μg to 200 μg of the polynucleotide.

31. The method of claim 29, wherein a second intramuscular injection and epidermal injection are administered at least about three weeks after the first injection.

32. The method of claim 25, wherein the provision of the *Chlamydia* antigen(s) comprises:

(a) preparing a pharmaceutical composition comprising at least one polynucleotide having a sequence of SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, SEQ ID NO:26, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:40, SEQ ID NO:42, SEQ ID NO:44, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:50, SEQ ID NO52:, SEQ ID NO:54, SEQ ID NO:56, SEQ ID NO: 58, SEQ ID NO:60, SEQ ID NO:62, SEQ ID NO:64, SEQ ID NO:66, or SEQ ID NO:68, or fragment thereof;

(b) administering the pharmaceutical composition to the animal; and

(c) expressing one or more *Chlamydia* antigens in the animal.

33. The method of claim 32, wherein the at least one *Chlamydia* antigen has a sequence of SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, or SEQ ID NO:27 or an antigenic fragment thereof.

34. The method of claim 33, wherein the at least one *Chlamydia* antigen has a sequence of SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:21, or SEQ ID NO:25, or an antigenic fragment thereof.

35. The method of claim 32, wherein the at least one *Chlamydia* antigen has a sequence of SEQ ID NO:63, SEQ ID NO:65, SEQ ID NO:67, or SEQ ID NO:69, or an antigenic fragment thereof.

36. The method of claim 32, wherein the polynucleotide is administered by a first intramuscular injection or epidermal injection.

37. The method of claim 36, wherein the polynucleotide is administered by a second intramuscular injection and epidermal injection.

38. The method of claim 37, wherein the intramuscular injection is at least 1.0 μg to 200 μg of the polynucleotide.

39. The method of claim 25, wherein the provision of the *Chlamydia* antigen(s) comprises:

(a) preparing a pharmaceutical composition of at least one *Chlamydia* antigen having a sequence of SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:45, SEQ ID NO:47, SEQ ID NO:49, SEQ ID NO:51, SEQ ID NO:53, SEQ ID NO:55, SEQ ID

NO:57, SEQ ID NO:59, SEQ ID NO:61, SEQ ID NO:63, SEQ ID NO:65, SEQ ID NO:67, or SEQ ID NO:69, or an antigenic fragment thereof; and

(b) administering the at least one antigen or fragment into the animal.

40. The method of claim 39, further defined as comprising preparing a pharmaceutical composition of at least one *Chlamydia* antigen having a sequence of SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, or SEQ ID NO:27, or an antigenic fragment thereof.

41. The method of claim 39, further defined as comprising preparing a pharmaceutical composition of at least one *Chlamydia* antigen having a sequence of SEQ ID NO:7, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:21, or SEQ ID NO:25, or an antigenic fragment thereof.

42. The method of claim 39, further defined as comprising preparing a pharmaceutical composition of at least one *Chlamydia* antigen having a sequence of SEQ ID NO:63, SEQ ID NO:65, SEQ ID NO:67, or SEQ ID NO:69, or an antigenic fragment thereof.

43. The method of claim 25, wherein the animal is a mammal.

44. The method of claim 43, wherein the animal is a bovine.

45. The method of claim 43, wherein the animal is a human.

46. The method of claim 25, wherein the method is effective to induce an immune response against *Chlamydia psittaci.*

47. The method of claim 25, wherein the method is effective to induce an immune response against *Chlamydia pneumoniae.*

48. The method of claim 25, wherein the method is effective to induce an immune response against a *Chlamydia* species other than *Chlamydia psittaci* or *Chlamydia pneumoniae*.

49. The method of claim 25, wherein the method is effective to induce an immune response against a non-*Chlamydia* infection.

50. The method of claim 25, further comprising administering to the animal an antigen or an antigenic fragment from a *Chlamydia* species other than *Chlamydia psittaci* or *Chlamydia pneumoniae*.

51. The method of claim 25, further comprising administering to the animal an antigen or an antigenic fragment from a non-*Chlamydia* species.

52. A method of obtaining polynucleotide sequences effective for generating an immune response against the genus *Chlamydia* in an animal comprising:

(a) preparing a cloned expression library from fragmented genomic DNA of the genus *Chlamydia*;

(b) administering one or more clones of the library in a pharmaceutically acceptable carrier into the animal in an amount effective to induce an immune response; and

(c) selecting from the library the polynucleotide sequences that induce an immune response,

wherein the immune response in the animal is protective against *Chlamydia* infection.

53. The method of claim 52, further comprising testing the animal for immune resistance against a *Chlamydia* bacterial infection by challenging the animal with *Chlamydia*.

54. The method of claim 52, wherein the genomic DNA is fragmented physically or by restriction enzymes.

55. The method of claim 54, wherein the fragments are, on average, about 200-1000 base pairs in length.

56. The method of claim 52, wherein each clone in the library comprises a gene encoding a mouse ubiquitin fusion polypeptide designed to link the expression library polynucleotides to the ubiquitin gene.

57. The method of claim 52, wherein the library is about $1x10^3$ to about $1x10^6$ clones.

58. The method of claim 57, wherein the library is $1x10^5$ clones.

59. The method of claim 52, wherein about 0.01 μg to about 200 μg of DNA, cDNA or sequenced gene from the clones is administered into the animal.

60. The method of claim 59, wherein the genomic DNA, cDNA or sequenced gene is introduced by intramuscular injection or epidermal injection.

61. The method of claim 52, wherein the fragmented genomic DNA, cDNA or sequenced genes of *Chlamydia* further comprises a promoter operably linked to the DNA that permits expression in a vertebrate animal cell.

62. A method of preparing antigens that confer protection against infection in a vertebrate animal comprising the steps of:

a) preparing a cloned expression library from fragmented genomic DNA of the genus *Chlamydia psittaci*;

(b) administering one or more clones of the library in a pharmaceutically acceptable carrier into the animal in an amount effective to induce an immune response;

(c) selecting from the library the polynucleotide sequences that induce an immune response and expressing the polynucleotide sequences in cell culture; and

(d) purifying the polypeptide(s) expressed in the cell culture.

63. The method of claim 62, further comprising testing the animal for immune resistance against infection by challenging the animal.

64. The method of claim 63, wherein the animal is challenged with *Chlamydia psittaci*.

65. A method of preparing antibodies against a *Chlamydia* antigen comprising the steps of:

(a) identifying a *Chlamydia* antigen that confers immune resistance against *Chlamydia* bacterial infection when challenged with the *Chlamydia* species in which the antigen was prepared;

(b) generating an immune response in a vertebrate animal with the antigen identified in step (a); and

(c) obtaining antibodies produced in the animal.

66. A method of assaying for the presence of *Chlamydia* infection in a vertebrate animal comprising:

(a) obtaining an antibody directed against a *Chlamydia* antigen;

(b) obtaining a sample from the animal;

(c) admixing the antibody with the sample; and

(d) assaying the sample for antigen-antibody binding,

wherein the antigen-antibody binding indicates *Chlamydia* infection in the animal.

67. The method of claim 66, wherein the antibody directed against the antigen is further defined as a polyclonal antibody.

68. The method of claim 66, wherein the antibody directed against the antigen is further defined as a monoclonal antibody.

69. The method of claim 66, wherein the *Chlamydia* antigen has a sequence of SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:29, SEQ ID NO:31, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:45, SEQ ID NO:47, SEQ ID NO:49, SEQ ID NO:51, SEQ ID NO:53, SEQ ID NO:55, SEQ ID NO:57, SEQ ID NO:59, or SEQ ID NO:61, or an antigenic fragment thereof.

70. The method of claim 66, wherein the *Chlamydia* antigen has a sequence of SEQ ID NO:63, SEQ ID NO:65, SEQ ID NO:67, or SEQ ID NO:69, or an antigenic fragment thereof.

71. The method of claim 66, wherein assaying the sample for antigen-antibody binding is by precipitin reaction, radioimmunoassay, ELISA, Western blot or immunofluorescence.

72. A kit for assaying a *Chlamydia* infection comprising, in a suitable container means:

(a) a pharmaceutically acceptable carrier; and

(b) an antibody directed against a *Chlamydia* antigen.

73. A method of testing for antigens for a first disease state or infectious agent comprising:

(a) determining an antigenic polypeptide or a nucleic acid encoding an antigenic polypeptide from a second disease state or infectious agent;

(b) obtaining a homolog of the antigenic polypeptide or a nucleic acid encoding an antigenic polypeptide from a second disease state or infectious agent for the first disease state or infectious agent;

(c) testing the homology to see if it is an antigenic polypeptide or a nucleic acid encoding an antigenic polypeptide for the first disease state or infectious agent.